

CLAIMS:

1. A winch for use with a strap for fastening a load onto a transportation vehicle, the winch comprising:

5 a tightening assembly, the tightening assembly comprising:

a support structure having first and second support flanges and a cross member extending between the support flanges, the cross member being devised for mounting onto a corresponding side track of the vehicle; and

10 a tightening reel for receiving a portion of the strap to be tightened about said reel, the tightening reel being pivotally mounted onto the first and second support flanges;

a gear assembly operatively connected to the tightening assembly, the gear assembly comprising:

15 a gear securely mounted about the tightening reel so as to rotate with said reel;

a worm positioned adjacent to the gear and operable between a first configuration where the worm is away from the gear, and a second configuration where the worm is threadedly engaged with the gear so that 20 a rotation of the worm drives the tightening reel via the gear; and

a casing mounted onto the first support flange of the support structure and having corresponding recesses for containing the gear and worm respectively.

25 2. A winch according to claim 1, wherein the winch comprises:

a winding assembly removably mountable onto the tightening assembly, the winding assembly comprising:

a support structure having first and second extensions and a cross member extending between the extensions, the ends of the extensions being removably mountable onto the tightening assembly; and

a winding reel for receiving an excess portion of the strap to be wound about the same, the winding reel being pivotally mounted onto the first and second extensions.

5 3. A winch according to claim 1 or 2, wherein the tightening assembly comprises a clamping lamella removably mounted onto the tightening reel, the clamping lamella being provided with at least one leg mounted into the tightening reel and being movable thereabout, the clamping lamella being operable between a first configuration where it is positioned away from the tightening reel so as to enable a portion of the strap to be brought onto and removed from the tightening reel, and a second configuration where the clamping lamella is positioned with respect to the tightening reel so as to define a slit between the lamella and the tightening reel for receiving a segment of the strap thereinbetween, and where further rotation of the tightening reel, and further rotation of the strap about the 10 clamping lamella, biases the clamping lamella towards the tightening reel for 15 clamping the strap segment against the tightening reel.

4. A winch according to claim 2 or 3, wherein the ends of the extensions of the winding assembly are removably mountable onto the tightening 20 reel of the tightening assembly, and wherein the winding assembly is pivotably movable with respect to said tightening assembly, the winch further comprising adjustment means for selectively adjusting the positioning of the winding assembly with respect to the tightening assembly.

25 5. A winch according to claim 4, wherein the adjustment means comprise:

 a plurality of notches provided along a peripheral side portion of the second support flange of the tightening assembly; and

30 a locking pin provided on the second extension of the support structure of the winding assembly for removably inserting into a corresponding notch of the peripheral side portion of the second support flange of the tightening assembly so

as to lock the winding assembly into a corresponding position with respect to the tightening assembly.

6. A winch according to any one of claims 2 to 5, wherein the ends of
5 the first and second extensions of the winding assembly are provided with a hook
and a hole respectively, the hook being shaped and sized for hooking the first
extension onto the tightening reel, between the first and second support flanges
of the support structure of the tightening assembly, adjacent to the first support
flange, and the hole being shaped and sized for mounting the second extension
10 onto an end of the tightening reel, adjacent to an outer face of the second support
flange.

7. A winch according to claim 6, wherein the winch comprises an
abutment pin provided on an inner face of the first support flange of the tightening
15 assembly, said abutment pin cooperating with a curved portion of the hook of the
first extension, the abutment pin being positioned on said inner face and the
curved portion being shaped and sized so as to prevent the hook from being
removed from the tightening reel along a predetermined range of rotation of the
winding assembly with respect to the tightening assembly.

20 8. A winch according to any one of claims 1 to 7, wherein ends of the
tightening reel and of the worm are provided with corresponding heads for
receiving a socket of a corresponding cranking tool.

25 9. A winch according to claim 8, wherein the head of the worm is
provided with a shear pin extending between said head and the end of the worm
on which the head is mounted.

30 10. A winch according to any one of claims 1 to 9, wherein one end of
the winding reel is provided with a corresponding head for receiving a socket of a
cranking tool, said corresponding head being securely mounted to the winding
reel so as to rotate therewith.

11. A winch according to any one of claims 1 to 10, wherein another end of the winding reel is provided with a knob being theadedly mountable onto said another end of the winding reel.

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12. A winch according to any one of claims 2 to 11, wherein the support structures of the tightening and winding assemblies are substantially U-shaped.

13. A winch according to any one of claims 2 to 12, wherein the winch 10 comprises with a rod mounted onto the winding reel so as to define a slit between the rod and the winding reel, said slit being shaped and sized for receiving an end portion of the strap.

14. A winch according to any one of claims 1 to 13, wherein the recess 15 of the casing containing the worm is a bore, and wherein the worm is slidably movable within said bore so as to facilitate operation of the worm between its first and second configurations.

15. A winch according to any one of claims 1 to 14, wherein the gear 20 assembly comprises:

a ratchet wheel securely mounted about the tightening reel so as to rotate with said reel, the ratchet wheel being provided with a plurality of peripheral teeth; and

25 a pawl lever having an extremity positioned adjacent to the ratchet wheel and operable between a first configuration where the extremity of the pawl lever is away from the ratchet wheel, and a second configuration where the extremity of the pawl lever is inserted into a corresponding tooth of the ratchet wheel, thereby preventing the ratchet wheel and the tightening wheel from further rotating along a given direction.

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16. A transportation vehicle comprising a winch according to any of claims 1 to 15.

17. A method of fastening a load with a strap onto a transportation vehicle according to claim 16, the method comprising the steps of:

- a) providing the transportation vehicle;
- 5 b) mounting the winch onto a corresponding side track of the transportation vehicle;
- c) attaching a first extremity of the strap onto an anchoring point;
- d) clamping a portion of the strap about the tightening reel;
- e) rotating the tightening reel so as to tighten the strap.

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18. A method according to claim 17, wherein step e) comprises the step of:

- f) operating the worm in its second configuration so as rotate the tightening reel via the gear.

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19. A method according to claim 17 or 18, wherein the method comprises the steps of:

- g) mounting a winding assembly onto the tightening assembly of the winch, said winding assembly comprising:
 - a support structure having first and second extensions and a cross member extending between the extensions, the ends of the extensions being removably mountable onto the tightening reel of the tightening assembly; and
 - a winding reel for receiving an excess portion of the strap to be wound about the same, the winding reel being pivotally mounted onto the first and second extensions; and
- 20 h) winding an excess portion of the strap onto the winding reel of the winding assembly.

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